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A REVISION OF  
THE NORTH AMERICAN COMADIA

(COSSIDAE)

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THIS PAPER IS THE RESULT of my attempt to confirm and place in the genus a species that was described as *Comadia suaedivora* Brown and Allen (1973). During this work I discovered the lack of any recent literature and the existence of many specimens, mostly from California, that did not fit the previously described species.

The material used in this study was borrowed from the following institutions: California Academy of Sciences, San Francisco; Canadian National Collection, Ottawa, Ontario; Carnegie Museum, Pittsburgh, Pennsylvania; The American Museum of Natural History, New York; California Department of Agriculture, Sacramento; Los Angeles County Museum of Natural History, Los Angeles, California; University of California, Berkeley; United States National Museum, Washington, D.C.

Approximately 450 specimens were used in this study, including the Allotype of *Heterocoma albistriga* Barnes & McDunnough, the genitalia of the Holotype of *Comadia bertholdi bertholdi* (Grote), and a number of paratypes of various other species. Dr. Ronald W. Hodges kindly compared specimens to additional material in the U.S. National Museum.

COMADIA BARNES AND McDUNNOUGH

*Bombyx* Linnaeus, 1785, *Syst. Nat.*, 1:496.

*Zeuzera* Latreille, 1804, *Nouv. Dict. d'Hist. Nat.*, 24:186.

*Hypopta* Hübner, 1816, *Verz. beck. Schmett.*, pg. 195; Neumoegen & Dyar, 1893, *Journ. N. Y. Entomol. Soc.*, 1:32; *ibid*, 1894, *Journ. N. Y. Entomol. Soc.*, 2:164.

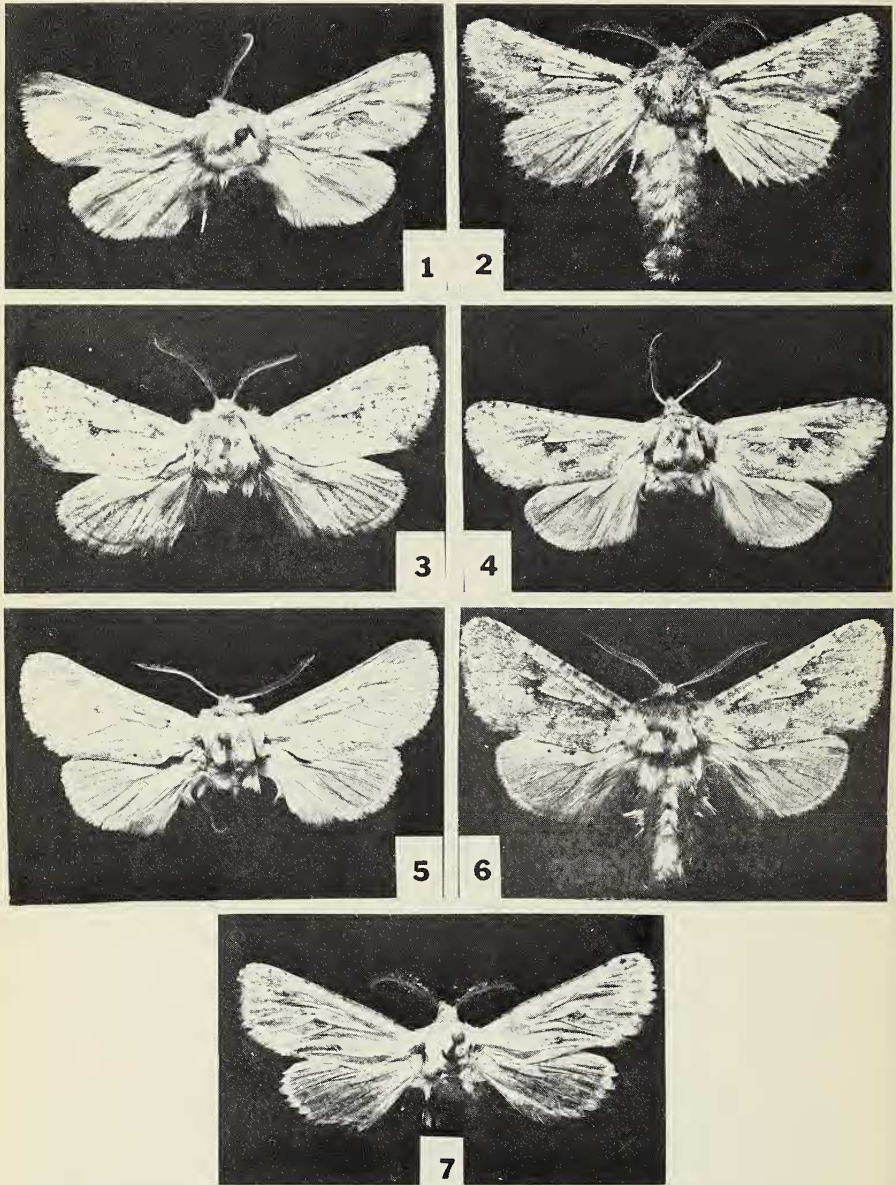


Fig. 1, *Comadia henrici*, Blyth, Riverside Co., California; Fig. 2, *Comadia suaedivora*, paratype, Tipton, Tulare Co., California; Fig. 3, *Comadia doli*, Soldier Meadows, Humboldt Co., Nevada; Fig. 4, *Comadia intrusa*, Santa Monica, Los Angeles Co., California; Fig. 5, *Comadia arenae*, Holotype, Wheeler Spring, Ventura Co., California; Fig. 6, *Comadia subterminata*, Tonto Creek Camp, Gila Co., Arizona; Fig. 7, *Comadia speratus*, Holotype, Madera, Madera Co., California.

*Comadia* Barnes & McDunnough, 1911, *Contrib. Natur. Hist. Lepid. of N. Amer.*, 1:26-29; Barnes & Benjamin, 1923, *Contrib. Natur. Hist. Lepid. of N. Amer.*, 5:88-96.

*Heterocoma* Barnes & McDunnough, new synonymy, 1918, *Contrib. Natur. Hist. Lepid. of N. Amer.*, 4(2):179; McDunnough, 1939, Check List of Lepid. of Canada and U. S. Amer., Part 2, *Microlepid.* pg. 62.

Head: proboscis absent; clypeus flat, level with or recessed below level of eyes. Male antennae bipectinate to end, pectinations arising from middle of segments on ventral half, each pectination with inner surface pubescent, terminating with one seta, a dorsal nob with one seta three fourths from base; female antennae serrate, shallowly bifid, each terminating with one or two setae. Thorax: epiphysis simple, less than tibial length; hind tibiae swollen; all spurs present. Wings (fig. 15): forewing Sc. free,  $R_1$  from middle of discal cell,  $R_2$  from top of areole,  $R_3$  from end of areole,  $R_4$  and  $R_5$  stalked from  $R_3$ ,  $M_1$  usually from top angle of discal cell,  $M_2$  and  $M_3$  from below center of discal cell,  $A_1$  and  $A_2$  free; hindwing Sc. free, R and  $M_1$  usually from a point, but may be separated or stalked,  $Cu_1$  from lower angle of discal cell,  $Cu_2$  from bottom of discal cell,  $A_1$ ,  $A_2$ , and  $A_3$  free; cellula intrusa in both wings. Abdomen clothed with long hairs laterally lengthened. Male genitalia (fig. 17); harpé upturned, more or less squared posteriorly, inner surface slightly excavated; valvula with strong hooked process at base just below the costa; tegumen broad, hood shaped with 2 to 6 setae at anterior corners of base; uncus small, deflexed as a short, strong hook; gnathos spoon shaped with long diverging arms; aedeagus as simple sclerotic tube slightly deflexed from middle, without internal sculpturing. Female genitalia (fig. 16); ovipositor simple, long and tapering; posterior and anterior apophysis long, well developed; ovipositor lobe densely covered with setae, as is posterior edge of segment 8; ductus bursa and bursa membranous, without any chitinized structure.

#### KEY TO THE SPECIES OF *COMADIA*

(Based on male characters)

1. Both wings light buff or cream colored; without dark brown discocellular spots .....2.
- Both wings pale gray to dark gray or brown, with or without dark brown discocellular spots .....3.

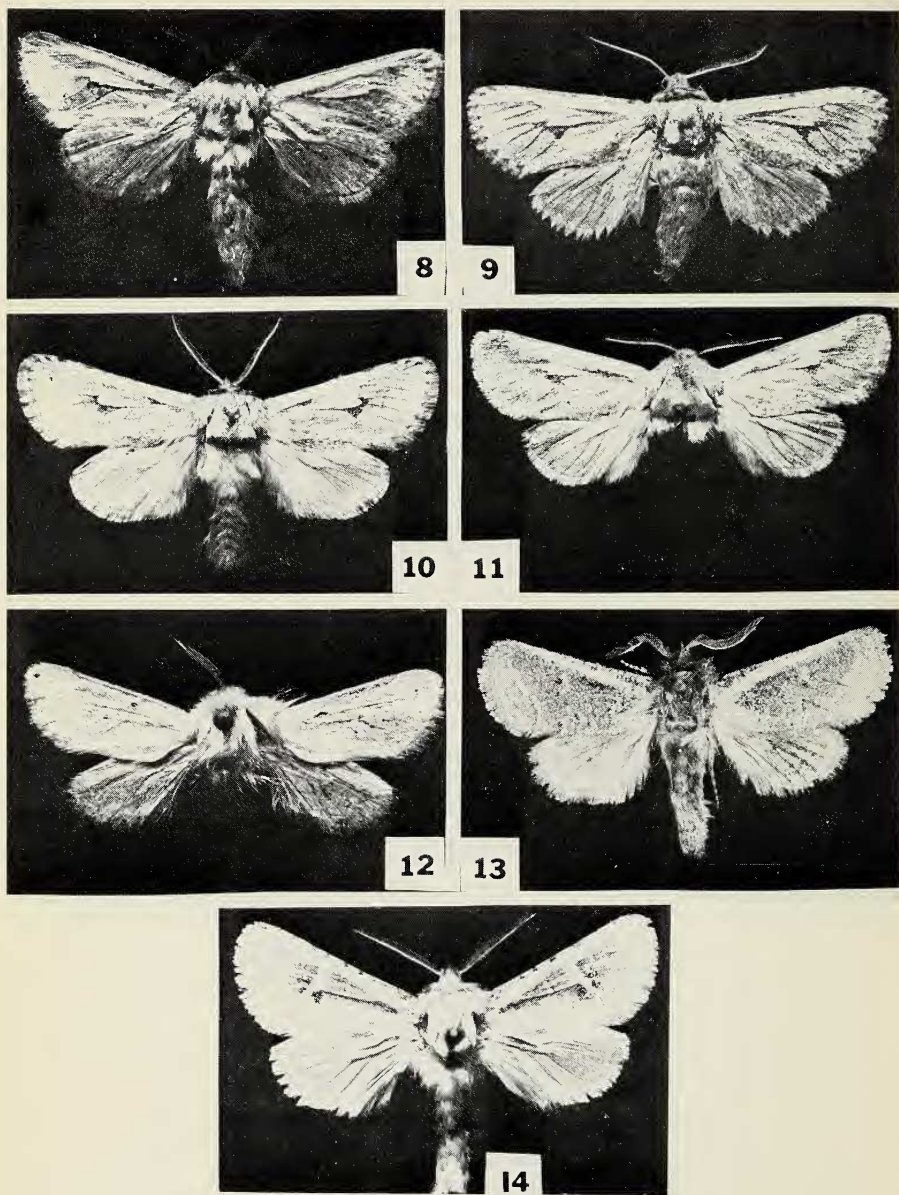


Fig. 8, *Comadia bertholdi indistincta*, Holotype, 8 mi. w. Fort Jones, Siskiyou Co., California; Fig. 9, *Comadia bertholdi polingi*, Kenworthy, Riverside Co., California; Fig. 10, *Comadia bertholdi polingi*, paratype, Bent, Otero Co., New Mexico; Fig. 11, *Comadia alleni*, Holotype, La Grange, Stanislaus Co., California; Fig. 12, *Comadia manfredi*, Oro Blanco Mts., Santa Cruz Co., Arizona; Fig. 13, *Comadia redtenbacheri*, Big Bend National Park, Brewster Co., Texas; Fig. 14, *Comadia albistriga*, Alamogordo, Otero Co., New Mexico.

2. Wings not more than 10 mm. long, cream colored, immaculate, epiphysis one half tibia length .....*manfredi*.  
Wings at least 12 mm. long, light buff with white markings; epiphysis greater than one half tibia length .....*henrici*.
3. Upper forewing with at least some dark discocellular scaling present; wing not crossed by lines formed by bicolored scales .....4.  
Upper forewing without discocellular scaling; wing crossed with numerous lines formed by an alignment of bicolored scales; epiphysis quite short .....*redtenbacheri*.
4. Discocellular spot divided by prominent whitish discal bar extending to Cu<sub>2</sub> in the tornal area; a white bar along cubital vein to discal bar; white subterminal line; epiphysis minute or missing .....*albistriga*.  
Upper forewing not so divided by white bar; epiphysis well developed .....5.
5. Upper surface of wings dark gray to brown .....6.  
Upper surface of wings silver gray to white .....8.
6. Upper forewing with subterminal line; discocellular spot covering entire end of discal cell (Utah, Colorado, Arizona, New Mexico) .....*subterminata*.  
Upper forewing usually without postmedial line; discocellular spot reduced to lower angle of discal cell (California) 7.
7. Upper forewing heavily dusted with gray; subcosta very white, discal cell with some white (San Joaquin Valley) .....*suaedivora*.  
Upper forewing lightly dusted with brown scaling; subcosta concolorous to wing, not white (coastal Southern California) .....*intrusa*.
8. Upper forewing pale tan or buff with scattered brown scales; veins lightly marked; discocellular spots relatively undefined; usually with some indications of subterminal lines .....*dolli*.  
Upper forewing more gray or white; without general scattering of dark scales; discocellular spots well defined, but may be reduced in size .....9.
9. Upper forewing light gray; discocellular spot greatly reduced, restricted to lower distal corner of discal cell ..*arenae*.  
Upper forewing light gray or white; discocellular spot prominent .....10.

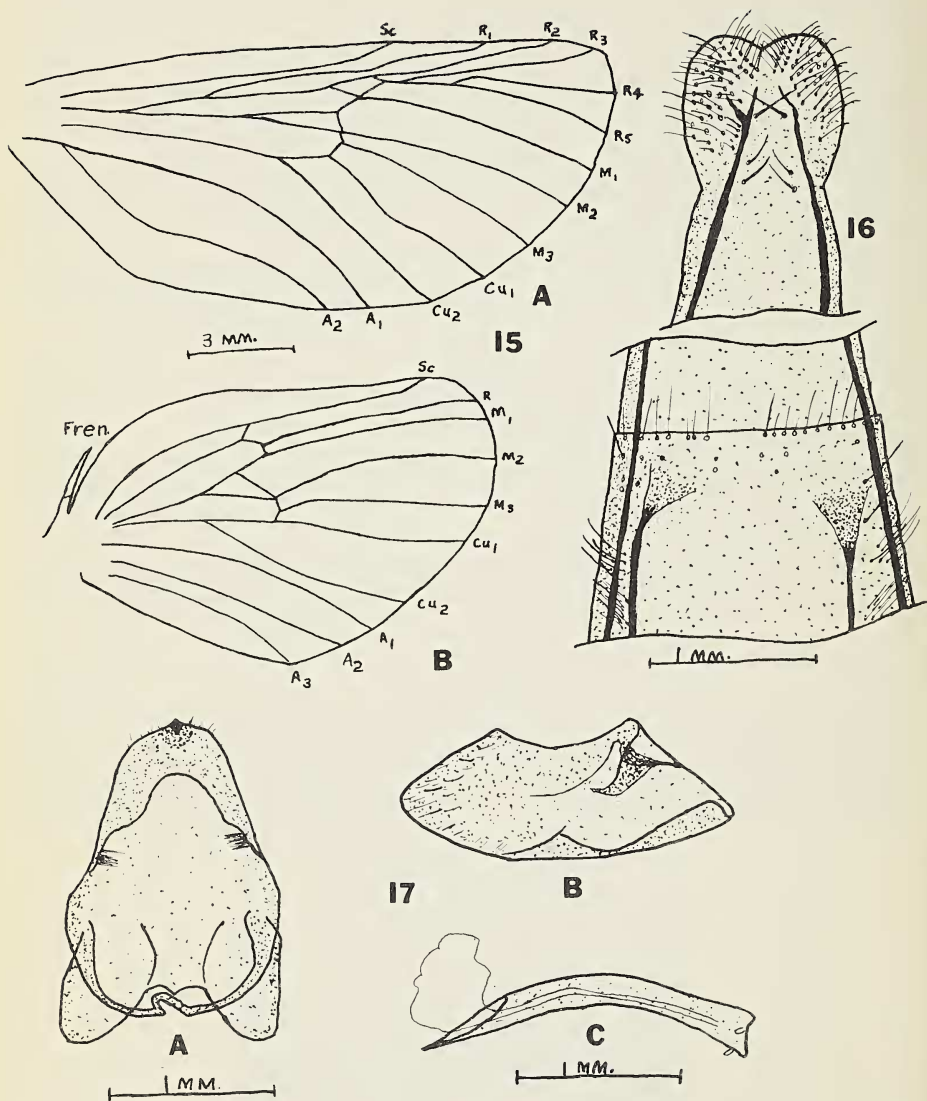


Fig. 15, Wing venation: A, right forewing, B, right hindwing; Fig. 16, Female genitalia; Fig. 17, Male genitalia: A, tegumen with gnathos and uncus, B, left harpé, C, aedeagus.  
 Distributional maps for *Comadia*.

10. Upper forewing white; veins unlined with dark brown .....11.  
 Upper forewing grayish; veins usually lined with dark brown, except for *bertholdi indistincta* .....12.
11. Discocellular spot dark, defined and contrasting with white wing; overlay of gray restricted to submarginal and apical region .....*speratus*.  
 Discocellular spot poorly defined; upper forewing with overlay of gray heavy except for submarginal and discal area, which is white .....*alleni*.
12. Discocellular spot restricted to lower angle of discal cell; veins lined dark to margin (Great Basin Region) .....13.  
 Discocellular much reduced; veins unlined (North and Coastal California) .....*bertholdi indistincta*.
13. Upper forewing light gray to cream with light suffusion of dark brown; subcosta and discal cell very white; median vein at base of discal cell dark brown; fringe well checkered at end of dark veins .....*bertholdi polingi*.  
 Upper forewing gray with heavy suffusion of dark brown; subcosta and discal cell with general wing suffusion; median vein at base of discal cell with dark brown greatly reduced or missing; fringe lightly checkered at end of dark veins .....*bertholdi bertholdi*.

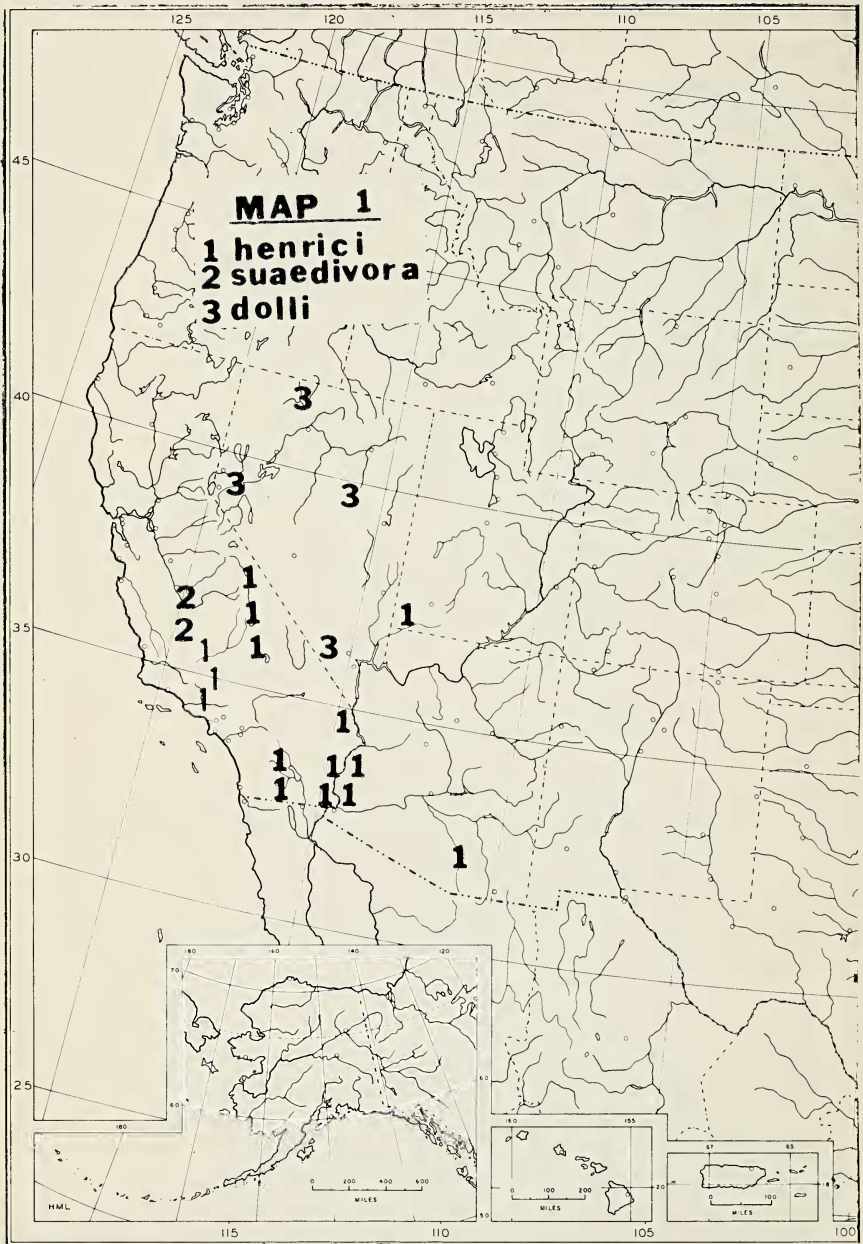
### COMADIA HENRICI (Grote)

(fig. 1 ♂)

*Hypopta henrici* Grote, 1882, *Papilio*, 2:31; Dyar, 1902, *Bull. U.S.N.M.*, 52:363; Neumoegen & Dyar, 1893, *Journ. N. Y. Entomol. Soc.*, 1:33; *ibid.*, 1894, *Journ. N. Y. Entomol. Soc.*, 2:165; Holland, 1903, *Moth Book*:379, Pl. 12, Fig. 3; Dyar, 1937, in Seitz, *Macrolepidoptera*, 6:1275, Pl. 182.

*Comadia henrici*; Barnes & McDunnough, 1911, *Contrib. Natur. Hist. Lepid. N. Amer.*, 1:28, Pl. 5, fig. 5; *ibid.*, 1917, *Check List of the Lepid. of Boreal Amer.*: 195.

Male: Head, thorax and abdomen light cream colored; longest antennal pectination four times shaft width; antennal pectination/eye diameter ratio average is .42; epiphysis/tibia ratio average is .67. Upper surface of wings, costa with buff scales scattered or in spots to apex; subcosta white; area between radial and cubital veins to submarginal area buff; remainder with buff spots between veins; basal half of cell  $M_3$  white, remainder buff; cell  $Cu_1$  buff to fringe; basal two thirds of cell  $Cu_2$  and anal cell





buff. All veins white; fringe white. Hindwings uniformly light cream, veins may be slightly darkened. Under surface of wings, with forewing costa somewhat darker than upper surface; dark scaling more diffuse, following general pattern of upper surface; hindwing concolorous to upper surface. Female; similar to male; abdomen longer, heavier. Wing size in male 12-15 mm; in female 16-20 mm.

Range.—California, Arizona, Utah, see map # 1. Flight period, March through May.

This species is recognized by its pale cream and buff color. The antennal pectination in the California specimens are slightly shorter than in those from Arizona and Utah. This species has the longest epiphysis in the genus. Of the 116 specimens examined, the majority are from Southern California.

COMADIA SUAEDIVORA Brown & Allen

(fig. 2 ♂)

*Comadia suaedivora* Brown and Allen, 1973, *Pan-Pacif. Entomol.*, 49:240.

Male: Head and thorax with mixture of white and brown scales; longest antennal pectination three times shaft width; antennal pectination/eye diameter ratio average is .42; epiphysis/tibia ratio average is .59. Upper forewing mostly fuscous; subcostal to subapex with discal cell invaded by white; discocellular spots reduced and restricted to lower angle of discal cell; usually a faint postmedial line present. Hindwing concolorous with abdomen. Under forewing costa with basal three-fifths dark brown, remainder white; dark subapical spot; postmedial line present; distally dark between veins. Hindwing creamy white with dark brown suffusion. Female: Similar to male, somewhat darker and larger. Wing size in male, 12-16mm; in female 12-17mm.

Early stages.—Brown and Allen (1973) reported that the larvae feed gregariously in the crown and roots of *Suaeda fruticosa* (L.) Forsk. The larva is rose-lavender colored with a heavily sclerotized horn on the dorsal surface of the anal flap. The pupa is dark brown and heavily spined. Pupation occurs in a subterranean chamber, but prior to emergence the pupa leaves the chamber and extends part way above the ground surface.

Range.—San Joaquin Valley in California, see map #1. Flight period, May and June.

*Comadia suaedivora* is nearly the darkest species in the genus, only *subterminata* is darker. However, *suaedivora* is differentiated by its white subcosta, contrastingly lighter hindwings and geographical distribution. Number of specimens examined, 99.

COMADIA DOLLI Barnes & Benjamin

(fig. 3 ♂)

*Comadia dolli* Barnes & Benjamin, 1923, *Contrib. Natur. Hist. Lepid. N. Amer.*, 5:90.

*Hypopta dolli*; Dyar, 1937, in Seitz, 6:1275.

Male: Head with cream and brown scales; antennae with cream colored scaling to end, longest antennal pectination is 2.5-3.0 times shaft width; antennal pectination/eye diameter ratio average is .36; epiphysis/tibia ratio average is .59. Thorax cream colored; collar blackish; partagia tipped in black. Abdomen lighter in color than thorax. Upper wings, ground color creamish-white; costa checkered, subcosta to subapical and upper part of discal cell white; rest of wing with scattered brown scales; discocellular spots reduced, with only the veins outlined darker, except for  $Cu_1$  and  $Cu_2$  which are whitish; end of veins brown; fringe checkered at end of veins. Hindwings concolorous or slightly darker, veins lined darker. Under wings cream to fuscous; fore and hindwings concolorous. Female: Wing length same as in the male, abdomen longer; upper surface forewing with discocellular cell wanting; wing scattered with brown scales, some forming short reticulations between veins. Hindwings as in male. Wing size 12-15mm.

Range.—California, Nevada, see map #1. Flight period, April through July.

This moth has the patches at the end of the discal cell reduced and restricted to the lower angle and cubital veins. *Comadia dolli* is very close to *bertholdi* in size and markings, but has longer antennal pectinations, longer epiphysis and a tendency to subterminal lines. Also, *dolli* tends to have a cream coloration similar to *henrici*, as opposed to the gray-white of *bertholdi*. Number of specimens examined, 16.

COMADIA INTRUSA Barnes & Benjamin

(fig. 4 ♂)

*Hypopta bertholdi*; Rivers, 1897, *Psyche*, 8(249):10; Dyar, 1897, *Psyche* 8(249):10; Holland, 1903, *Moth Book*:379, Pl. XII fig. 2.

*Comadia intrusa* Barnes and Benjamin, 1923, *Contrib. Natur. Hist. Lepid. N. Amer.*, 5:92.

*Hypopta intrusa*; Dyar, 1937, in Seitz, 6:1275.

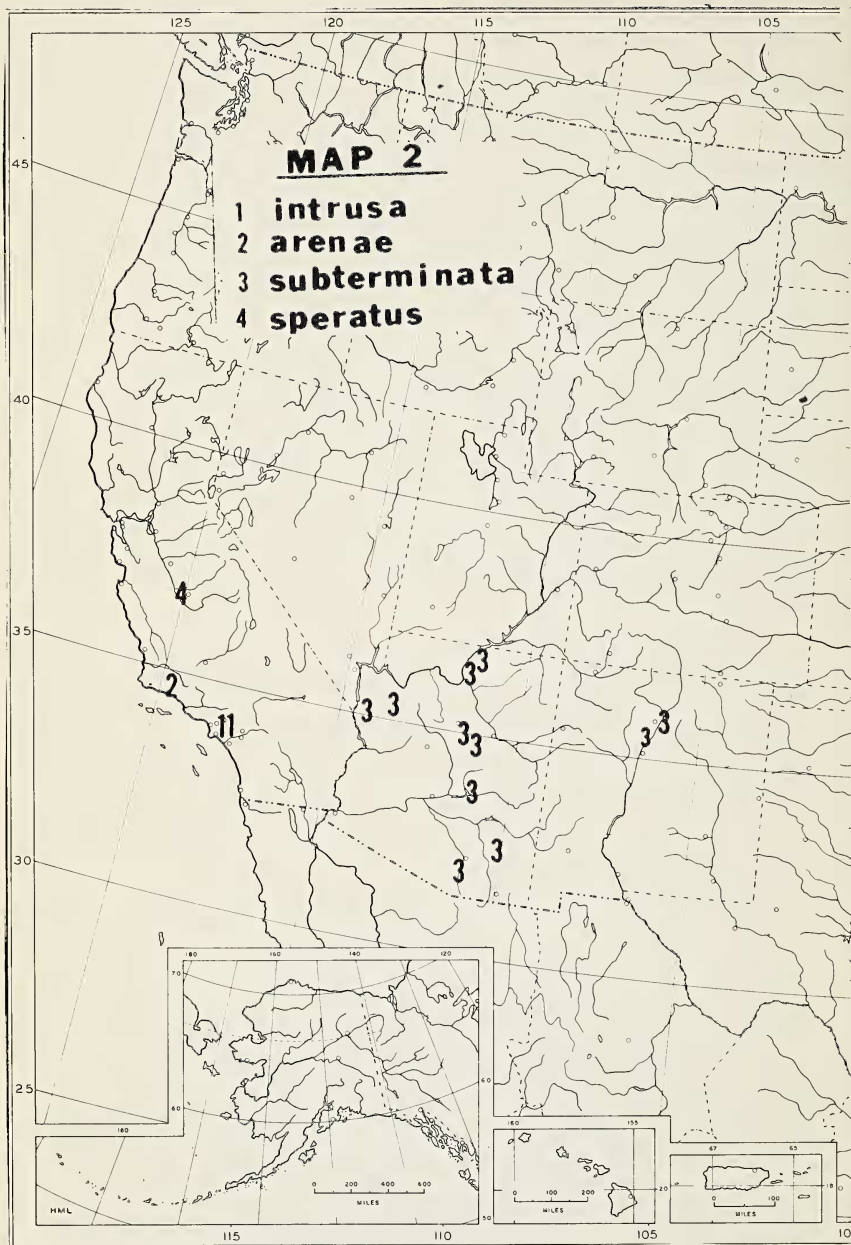
Male: Head and thoracic vestiture with white and dark-brown scales; longest antennal pectinations two times shaft width; antennal pectination/eye diameter ratio average is .29; epiphysis/tibia ratio average is .59; abdomen not darker than thorax. Upper forewing white with a light scattering of pale brown; discocellular spots pale and diffuse; veins outlined darker brown; reticulated submargin present. Hindwing light fuscus. Under forewing with costa checkered or solid brown on basal half, remainder white; remainder ventral surface fuscus. Under hindwing concolorous with forewing. Female: Larger, with markings less defined than in male. Wing size in male 13-17mm; female 20mm.

Early stages.—Rivers (1897) in his brief account of the larvae of "*Hypoptya bertholdi* Grote" reports that its food "consists of the fibre of the main stem and larger roots of the lilac flowered lupin," and that the presence of larvae of different ages in the same plant implies that larval growth extends beyond one year. The larvae wander some distance from the plant and pupate in a subterranean chamber more than one foot deep. Just prior to eclosion the pupa extends part way above the ground surface.

The color of the larva when about one half inch long is a yellow white, but when larger it becomes a bright carnelian red, heightened by an enameled surface (Rivers, 1897). Additional characterization of the larvae by Dyar (1897) tells of the body being ventrally flattened, with a large black recurved horn above on the anal flap. Thoracic legs are small and pointed; abdominal legs are very short with crotchets distinct and arranged in two long parallel transverse rows.

Range.—California, see map #2. Flight period, June through August.

Dyar (1897) followed Rivers (1897) in recognizing the southern California larvae as *Hypoptya bertholdi* Grote, not realizing an undescribed species was involved. Holland (1903) figured a female he called *H. bertholdi*. I have a female *intrusa* from the Holland collection labeled "Moth Book Plate XII, fig. 2," that matches the specimen in the plate. Some *intrusa* strongly resemble *subterminata*, but do not have dark suffusion or the prominent reticulations found in *subterminata*. The antennal pectination in this species is the shortest found in *Comadia*. Specimens examined, 11.



*COMADIA ARENAE* Brown, new species  
(fig. 5 ♂)

Male: Head and thorax whitish-gray with a few brown scales; antennal shaft dorsally scaled, longest pectination twice the shaft width; antennal pectination/eye diameter ratio average is .29; epiphysis/tibia ratio average is .55. Abdomen concolorous with thorax. Upper forewing concolorous with body; discocellular spot represented by a few dark brown scales and ocher shading; base of cell  $Cu_1$  ocher; middle of cell  $A_1$  ocher; veins unmarked; fringe wide and white. Hindwings mouse-gray, veins lightly marked; fringe as on forewing. Under forewing costa with white and dark brown scales mixed to three-fifths from base, remainder white; remainder of wing light fuscous; fringe white. Hindwing lighter; fringe white. Wing length in Holotype 15mm; variation, 13-17mm.

*Holotype male*, California, Ventura County, Wheeler Springs, 29 July 1943, Don Meadows. Paratypes: 4 ♂, same locality and collector as holotype, 1 ♂, 21 July 1943, 1 ♂, 27 July 1943, 2 ♂, 29 July 1943. Type disposition: The Holotype and three paratypes are at the Los Angeles County Museum of Natural History, Los Angeles, California; one paratype at the California Academy of Sciences, San Francisco. See distribution map #2.

This species is somewhat variable, with the discocellular spot greatly reduced or absent. There is no dark scaling on the veins and no concentration of dark suffusion on the upper forewing; this gives a uniform, smooth appearance. Number of specimens examined, 5.

*COMADIA SUBTERMINATA* Barnes & Benjamin  
(fig. 6 ♂)

*Comadia subterminata* Barnes and Benjamin, 1923, *Contrib. Natur. Hist. Lepid. N. Amer.*, 5:91.

*Hypopta subterminata*; Dyar, 1937, in Seitz, *Macrolepidoptera*, 6:1275.

*Comadia bertholdi fusca* Barnes and Benjamin, 1923, *Contrib. Natur. Hist. Lepid. N. Amer.*, 5:92.

Male: Head, palpi, front and vertex concolorous with or darker than thorax; thorax with mixture of black and white vestiture; longest antennal pectination 2.5-3.0 times shaft width; antennal pectination/eye diameter ratio average is .36; epiphy-

sis/tibia ratio average is .56. Upper forewing with ground color fuscus gray; costa with dark brown checks, in some specimens becoming a solid border; subcostal area and discal cell whiter; submarginal area with reticulations, usually consisting of one line that fades before reaching inner margin; discocellular spots quite heavy, extending cephalad to radials and caudad to vein  $A_2$ ; veins lined with brown. Hindwings light fuscous with veins lined darker. Under forewing costa dark brown, broken by two or three white spots two thirds out from base; remainder of wing fuscus. Under hindwing same as upper surface. Female: Larger than male, markings similar to male, but less distinct. Wing length in male, 13-18mm; in female 19-21mm.

Range.—Utah, Colorado, Arizona and New Mexico, see map #2. Flight period, March through July.

This species is closely related to *bertholdi*, but is distinguished from *bertholdi* by its larger size (wing averages 2mm longer) and increased amount of dark scaling. Barnes and Benjamin (1923) described *fusca* as a subspecies of *bertholdi*. In a preliminary examination Rodald W. Hodges (in correspondence) suggested that *fusca* and *subterminata* were actually the same species; in my research I have been unable to find any reason to keep them separate species. Number of specimens examined, 24.

COMADIA SPERATUS Brown, new species  
(fig. 7 ♂)

Male: Head, thorax white with pale fuscus shading about the collar; palpi quite black on the outer surface, white in inner surface; antennal shaft white scaled to tip; longest antennal pectination three times shaft width; antennal pectination/eye diameter ratio is .36; epiphysis/tibia ratio is .56. Abdomen white. Upper surface of wings with ground color very white; costa with dark brown scaling; discocellular spot at base of cells  $M_2$  and  $Cu_1$ ; a brown spot mid-cell  $A_1$ ; heavy suffusion of dark brown between discal cell and apex; discal cell and subcosta with less dark scaling; fringe checkered. Hindwing mouse gray, veins darker. Under forewing costa black three fifths out from base, remainder white; remainder of wing fuscus except for discal cell. Hindwing costa white; remainder of wing concolorous to forewing. Female unknown. Wing length in holotype, 15mm.

*Holotype male*, California, Madera County, Madera, 14 May 1962, H. E. Gleason. Paratypes, 2 ♂, same data as Holotype. See distribution map #2.

Type disposition.—The Holotype is at the California Academy of Sciences, San Francisco. Two paratypes are at the California Department of Agriculture, Sacramento.

This is the whitest of all the *Comadia*. The black shading on the forewing when viewed together form a diagonal band across the wing. The white color of this moth readily distinguishes it from the other *Comadia*. Number of specimens examined, 4.

### COMADIA BERTHOLDI (Grote)

*Hypopta bertholdi* Grote, 1880, *Bull. Brook. Entomol. Soc.* 3:45.

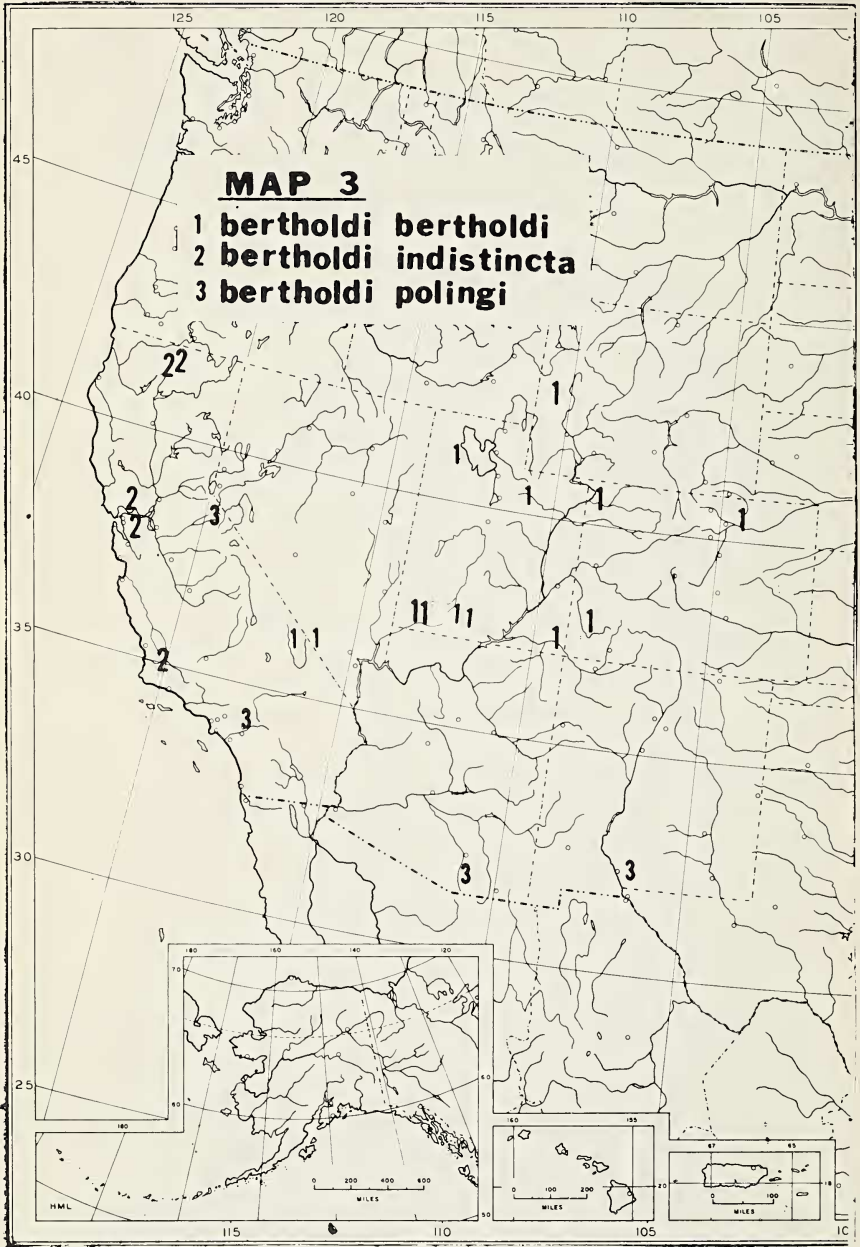
Male: Head and thorax with black and white mixed vestiture; abdominal color slightly lighter in color. Upper surface forewing from very light gray to a dark ash, with some black suffusion; heaviest suffusion obliquely from end of discal cell to apex; cubitus and end of discal cell caudad of  $M_2$  dark brown; base cell  $Cu_1$  and  $M_2$  with scaling as on cubitus; base of cell  $M_3$  usually without dark scaling; basal one third to one half of radius with dark scaling; remaining veins may or may not be lined in dark brown; fringe lightly checkered, beige to gray-brown. Under surface forewing costa dark brown or black; remainder of forewing and all of hindwing white to gray-brown. Female: Larger than male; ground color as in male; the dark color on the cubitus and at end of discal cell less distinct.

The slightly different maculation in each population of the variable species has caused the proliferation of names under the nominate subspecies. At present there are three subspecies; the nominate subspecies is from the Great Basin, *C. bertholdi polingi* is from the southwest and a new subspecies is from California.

### COMADIA BERTHOLDI BERTHOLDI (Grote), new status (no figure)

*Hypopta bertholdi* Grote, 1880, *Bull. Brook. Entomol. Soc.*, 3:45; Neumoegen & Dyar, 1893, *Journ. N. Y. Entomol. Soc.*, 1:33; *ibid.*, 1894, *Journ. N. Y. Entomol. Soc.*, 2:165; Rivers & Dyar, 1897, *Psyche*, 8:10; Holland, 1903, *Moth Book*: 379, Pl. XII fig. 2; Dyar, 1937, in Seitz, *Macrolepidoptera*, 6:1275, Pl. 182; Dyar, 1902, *Bull. U. S. N. M.*, 52:363.

*Comadia bertholdi*; Barnes & McDunnough, 1911, *Contrib. Natur. Hist. Lepid. N. Amer.*, 1:27; *ibid.*, 1917, *Check List of the Lepid. of Boreal Amer.*: 195.





*Hypopta edwardi* Neumoegen & Dyar, 1893, *Journ. N. Y. Entomol. Soc.*, 1:32; Dyar, 1937 in Seitz, *Macrolepidoptera*, 6:1275; Dyar, 1902, *Bull. U. S. N. M.*, 52:363.

*Comadia edwardi*; Barnes & McDunnough, 1917, *Check List of the Lepid. of Boreal Amer.*: 195.

*Comadia engelhardti* Barnes & Benjamin, 1923, *Contrib. Natur. Hist. Lepid. N. Amer.*, 5:89.

*Hypopta engelhardti*; Dyar, 1937, in Seitz, *Macrolepidoptera*, 6:1275, Pl. 182.

*Comadia stabilis* Barnes & Benjamin, 1923, *Contrib. Natur. Hist. Lepid. N. Amer.*, 5:90.

*Hypopta stabilis*; Dyar, 1937, in Seitz, *Macrolepidoptera*, 6:1275.

Male: Longest antennal pectination three times shaft width; antennal pectination/eye diameter ratio is .34; epiphysis/tibia ratio is .56. Upper surface of forewing with prominent dark suffusion; cubitus and end of discal cell caudad of  $M_2$  with heavy dark brown scaling; remainder of wings as described in general characterization. Female as described. Length of forewing: male 13-16mm; in female 18-19mm.

Range.—California, Colorado, Wyoming, see map #3. Flight period, June through August.

This is the darkest of the three subspecies and the most variable. I have not seen *C. edwardi*, but have placed it as a synonym of *bertholdi bertholdi*. Barnes and Benjamin (1923) doubted the validity of *edwardi* as a species, believing it to be a color form or an aberrant individual. Neumoegen and Dyar (1893) in their original description state that the type is from Colorado, which lends support to this concept. Number of specimens examined, 45.

*COMADIA BERTHOLDI INDISTINCTA* Brown,  
new subspecies  
(fig. 8)

Male: Similar to *bertholdi bertholdi* except cubitus with dark markings reduced; markings at end of cell less distinct. Female: Larger than male; dark scaling so reduced that the wings are nearly immaculate. Wing length in Holotype, 16mm.; in Allotype, 18mm.

Early stages.—The Allotype and one female paratype are labeled "Lupinus", presumably the host of this species, as the

perennial lupine is the host for *C. intrusa* in Southern California.

*Holotype male*, California, Siskiyou County, 8 miles west of Fort Jones, 21 June 1971, F. D. Horn. Allotype, California, Contra Costa County, Orinda, 18 July 1949, E. G. Linsley. Paratypes: California, Contra Costa County: Orinda, 1 ♀, 18 July 1949, E. C. Clark; Kern County: Mt. Pinos, 1 ♂, 12 July 1953, Lloyed M. Martin; Napa County: Mt. Saint Helena, 2 ♂, 30 June 1956, W. R. Bauer and J. S. Buckett; Siskiyou County: Etna, 4 ♂, 16 July 1970; 3 miles east of Etna, 3 ♂, 11 July 1971, F. D. Horn. Holotype and allotype are deposited at the California Academy of Sciences, one paratype is in the collection of the Los Angeles County Museum of Natural History, one paratype is in the California Insect Survey, University of California, Berkeley, and the remainder are at the California Department of Agriculture, Sacramento. See distribution map #3.

This subspecies is distinguished from *b. bertholdi* by the reduced, indistinct brown discocellular spots. Antennal pectination/eye diameter ratio is .37; epiphysis/tibia ratio is .50. Number of specimens examined, 13.

COMADIA BERTHOLDI POLINGI Barnes & Benjamin,  
new status

(figs. 9 ♂, 10 ♂)

*Comadia polingi* Barnes and Benjamin, 1927, *Pan-Pacif. Entomol.*, 4:67.

Male: Longest antennal pectination 2.5 to 3.0 times shaft width; antennal pectination/eye diameter ratio is .36; epiphysis/tibia ratio .48. Upper surface of forewing with reduced dark brown suffusion, white scaling prominent; subcosta to near apex without dark brown scales; costa dark brown, occasionally slightly checkered; dark brown of distal end of cell reduced; base of radial with dark brown streak about one fourth wing length. Hindwing slightly darker than forewing; veins lined dark. Under surface forewing with heavy brown suffusion except discal cell, which is paler. Under surface hindwing concolorous to upper surface. Female: Larger and with heavier brown suffusion than male. Wing length in male, 15-17mm; in female, 18-19mm.

Range.—Arizona, California, Nevada, New Mexico, see map #3. Flight period, May through August.

The white in *polingi* almost becomes a silver in some individuals. The brown scaling is always quite dark, but varies in amount present, thus, some specimens have the discocellular marking only on the veins. The over all darkness found in *bertholdi bertholdi* is not present. The range for *polingi* is around the southwestern edge of the Great Basin. Number of specimens examined, 40.

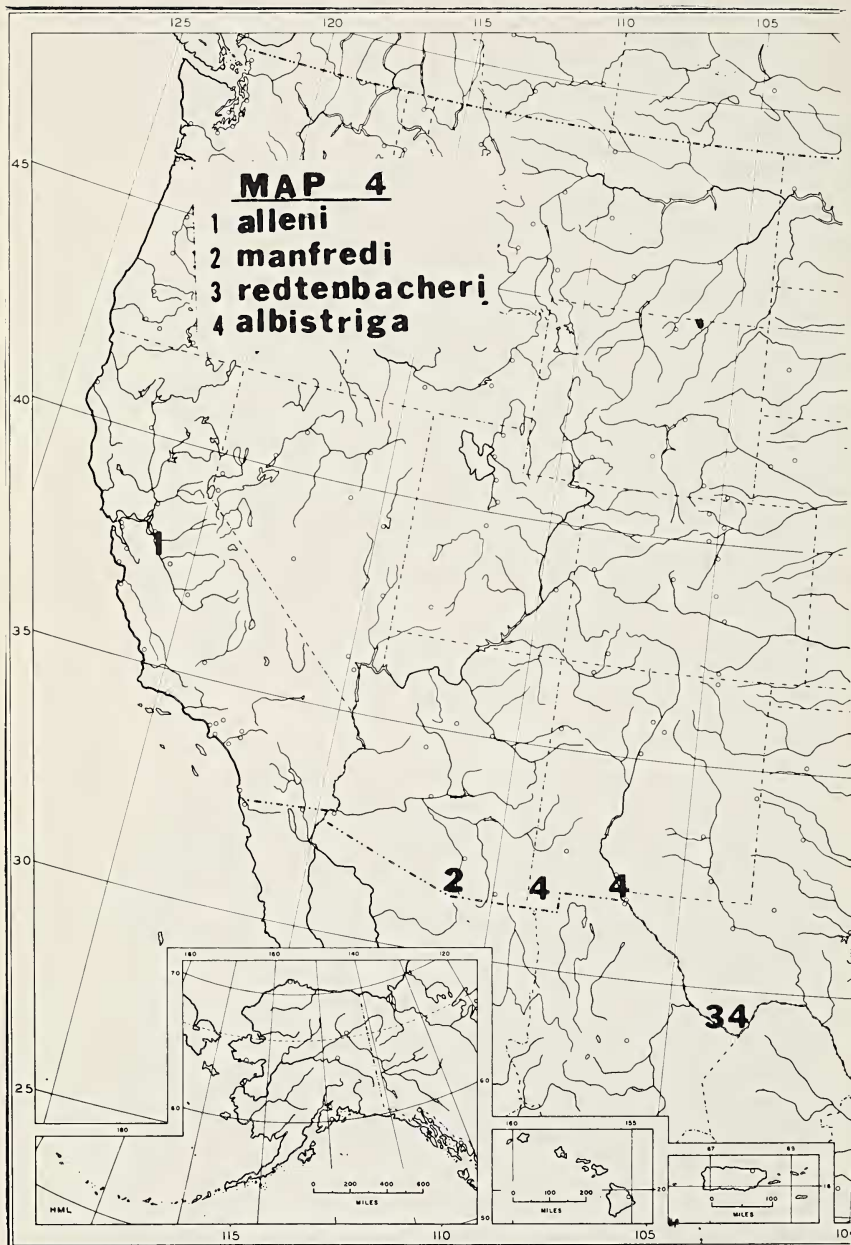
COMADIA ALLENI Brown, new species

(fig. 11 ♂)

Male: Head and thorax suffused with white and black scales; longest antennal pectination two times shaft width; antennal pectination two times shaft width; antennal pectination/eye diameter ratio is .43; epiphysis/tibia ratio is .5; antennal shaft white dorsally to apex. Forewing ground color white; oblique band of suffused fuscus from apex to end of discal cell; base of Radial vein with dark bar; Cubital vein and discocellular spot dark brown surrounded by ochre; middle of cell  $A_1$  with spot of ochre and dark brown; veins outlined dark, checkered at end; fringe checkered. Hindwing fuscus, veins outlined dark; fringe white. Under side: forewing fuscus except for white over discal cell and subapically at costa. Hindwing lighter but fuscus at apex; veins dark. Female paler and slightly larger than male, almost immaculate. Wing length in Holotype 17mm; in allotype 18mm.

*Holotype male*, California, Stanislaus County, La Grange, 30 May 1960, R. P. Allen. Allotype, same locality and collector, 17 May 1968. Paratypes: same locality and collector as Holotype, 1 ♂, 11 May 1968; 1 ♀, 2 June 1960. Holotype and allotype are deposited in the California Academy of Sciences, San Francisco; paratypes are deposited in the California Department of Agriculture, Sacramento. See distribution map #4.

This species is nearly as white as *speratus* but *alleni* has heavier gray shading on the forewing in an area obliquely from the apex through the discocellular spot and out to the fringe. I am naming this species in honor of my good friend R. P. Allen. Number of specimens examined, 4.



## COMADIA MANFREDI (Neumoegen)

(fig. 12 ♂)

*Hypopta manfredi* Neumoegen, 1884, *Papilio*, 3:139; Neumoegen and Dyar, 1893, *Journ. N. Y. Entomol. Soc.*, 1:33; *ibid.*, 1894, *Journ. N. Y. Entomol. Soc.* 2:164; Dyar, 1937, in Seitz, 6:1275; Dyar, 1902, *Bull. U. S. N. M.*, 52:363.

*Comadia manfredi*; Barnes and McDunnough, 1911, *Contrib. Natur. Hist. Lepid. N. Amer.*, 1:28; *ibid.*, 1917, *Check List of the Lepid. Boreal Amer.*, pg. 195.

Male: Head, thorax and abdomen covered with long cream colored hair; longest antennal pectination three times shaft width; antennal pectination/eye diameter ratio is .5; epiphysis/tibia ratio is .45. Upper fore and hindwings cream colored and devoid of all markings. Under forewing with a suffusion of dark along costa and subcosta; remainder of wing and hindwing concolorous with upper surface. Female unknown. Wing length in male, 11mm.

Range.—Arizona, see map #4. Flight period, May.

This species is the smallest and palest of all the *Comadia*, but has the longest antennal pectinations in the genus. From *henrici*, *manfredi* can be easily separated by its much smaller size, longer antennal pectination and shorter epiphysis. Specimens examined, 1.

## COMADIA REDTENBACHERI (Hammerschmidt),

new combination

(fig. 13 ♂)

*Zeuzera redtenbacheri* K. E. Hammerschmidt, 1848, in *Naturwissenschaftliche Abhandlungen, Gesammelt und Durch subscription von Wilhelm Haidinger*, 2:151-152.

*Bombyx agavis* I. Blásquez, 1870, *La Naturaleza*, 1:285-288.

*Hypopta agavis*; L. Ancona, 1930, *Anales Del Instituto De Biología de la Universidad Nacional Autónoma de Mexico*, 1:265-277.

*Hypopta chilodora* H. Dyar, 1910, *Proceed. Natur. Mus.*, 38:270.

*Hypopta redtenbacheri*; Dyar, 1937, in Seitz, *Macrolepidoptera*, 6:1275, Pl. 181.

Male: Head, dorsal thorax, dorsal abdomen with tan and dark brown scaling; ventrally less dark; longest antennal pectinations 2.5-3.0 times shaft width; antennal pectination/eye diameter ratio is .42; epiphysis/tibia ratio is .26. Upper forewing, subcosta with narrow, very white strip from wing base to just short of apex; general color brown; wing scales tan at

base, dark brown at tip; two lines of raised scales cross wing; lines whitish on inner edge, dark brown on outer edge, lines formed by an alignment of these bicolored scales; inner line bent inward below discal cell; outer line out curved, parallel to fringe; terminal with a few scattered white scales; fringe scales very long, longest white and spatulate at end; shorter scales concolorous to wing, less spatulate. Hindwing uniform gray-brown; fringe as in forewing. Under forewing costa dark brown near base, mixed with white near apex; discal cell with some long hair-like white scales; remainder of wing uniform gray-brown. Hindwing as upper surface. Female: Generally larger and marked similar to male; lines of raised scales less contrasting and more numerous as short dashes; general ground color paler than male, due to the lack of dark tipped scales. Wing length in male, 12-14mm; in female 13-16mm.

Early stages.—The life history has been studied by Hammer-schmidt (1848), Blásques (1870), and Ancona (1930). The host is *Agavis salmiana* Otto, (*Ameryllidaceae*) (Ancona 1930). The eggs are laid near the base of the leaves of the host and are coffee colored at the time of emergence. Larvae are pale reddish in the first instar, becoming carmine in the later instars. The last tergite has a group of five spines forming a horn. The pupa has an array of spines that aid in digging to the ground surface prior to eclosion. In the regions of Mexico where *Agavis salmiana* is of economic importance, a 15% infestation of the host has been found (Ancona, 1930).

Range.—In the Big Bend area of Texas and wide spread within the boundaries of its host in Mexico. See map #4. Flight period, April and May.

I have placed this moth in this genus on the grounds the genitalia and wing venation are well within the generic limits. Ancona (1930), in his treatise of the larvae, placed this species in *Hypopta* and made Dyar's (1910) *chilodora* a synonym of *agavis*. Dyar (1937) placed both *chilodora* and *agavis* as synonyms of *redtenbacheri*.

*Comadia redtenbacheri* is distinguished by the color, and the lines of bicolored raised scales crossing the wings. *Comadia henrici* and *albistriga* tend to have some of the dark scales at the end of the discal cell bicolored, but since *redtenbacheri* does not have this discocellular spot there should be no confusion between species. Number of specimens examined, 16.

COMADIA ALBISTRIGA (Barnes & McDunnough),  
new combination  
(fig. 14 ♂)

*Heterocoma albistriga* Barnes and McDunnough, 1918, *Contrib. Natur. Hist. Lepid. N. Amer.*, 4(2):179; McDunnough, 1939, Check List of Lepid. of Canada and U. S. Amer. Part 2, *Microlepidoptera*, pg. 62.

Male: Head and dorsal thorax creamy white, mixed with black and brown scales; collar lightly marked with dark border; ventral thorax without dark scales; antennal shaft dorsally scaled, concolorous to thorax; longest antennal pectination three times shaft width; antennal pectination/eye diameter ratio average .48; epiphysis/tibia ratio average .21. Abdomen with dorsal anterior two thirds to three fourths mouse gray, remainder paler; ventral abdomen concolorous to ventral thorax. Upper surface of wings with forewing costa with brown checks; subcosta creamy-white without checks; discal area mouse brown; white postmedial line formed by staggered bars between veins; distal postmedial line paler; vein  $A_1$  broadly creamy-white to fringe; discal spot large, creamy-white, extending to tornus; caudad  $A_1$  concolorous to submarginal area; fringe pale checked at vein end; discocellular scaling dark brown. Hindwings uniformly mouse brown; fringe creamy-white without checks. Under surface of wings with forewing costa and fringe as above; remainder of wing mouse brown. Under hindwing marked as above. Female: Nearly immaculate, brown shading found in male only faintly visible. Wing length in male 11-14mm; in female 13mm.

Range.—Arizona, New Mexico, Texas, see map #4. Flight period, April and May.

Barnes and McDunnough (1918) were in error when they established the genus *Heterocoma* for *albistriga*, based mainly on the lack of a cellula intrusa and the presence of strongly stalked veins R and  $M_1$ . There is variation among the individuals examined and *albistriga* is within the range of variation of *Comadia*.

*Comadia albistriga* can easily be recognized by the white bar crossing the wing from just below the costa through the brown discocellular spot to the tornal area. This line, when connected to the other three white lines, will form two triangles. Additionally, the upper forewing has variable reticulations formed by an alignment of dark brown tipped scales. These reticulations can be found any place on the wing except for the pale subterminal area.

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